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EKCo	Acceptance Test Procedure Briefing Print Enlarger Part No. 1-023-E-001	DWG. NO. 1-023-A-612

REFERENCE

For Acceptance Test Report,
See 1-023-A-613

REVISIONS

SYM	DESCRIPTION	DATE	APPROVAL

Declass Review by NGA.

STAT

SHEET 1 OF 14
TOTAL SHEETS: 14
DATE RELEASED: 7/27/67

1.0 Purpose

This procedure outlines the tests to be conducted to demonstrate the performance of the Briefing Print Enlarger. The successful completion of these inspections and tests constitutes assurance that the Briefing Print Enlarger fulfills the performance requirements.

2.0 References

2.1 Applicable Documents

2.1.1 Instruction Manual: Briefing Print Enlarger, P/N 1-023-E-001

2.1.2 DWG. No. 1-023-B-513 Installation Engineering Data

2.1.3 Mil - STD - 150A

2.1.4 Specification-Briefing Print Enlarger (No. 469-333B)

3.0 Facilities

3.1 Tools & Accessories Required

3.1.1 Standard electric timer (Certified calibration)

3.1.2 Screwdriver, wrenches, etc.

3.1.3 One empty 70mm x 500 ft. spool (MS 26565)

3.1.4 One empty 9-1/2 inch x 500 ft. spool (MS 26565)

3.1.5 One empty 5 inch x 500 ft. spool (MS 26565)

3.2 Test Material

3.2.1 50 sheets, 11 x 14 of Kodak Fine Grain Release Positive Film

3.2.2 50 sheets, 11 x 14 of Kodabromide F-2 paper S.W.

3.2.3 Roll film material on MS 26565spools not larger than 500 ft. size.

a. 70mm x 250 ft. Kodak Tri-X Aerecon Film Type 8403 processed clear.

b. 70mm x 1000 ft. Kodak High Definition Aerial Film Type 3404, processed clear.

c. 5 inch x 250 ft. Kodak High Definition Aerial Film Type 3404, processed clear.

d. 9-1/2 inch x 250 ft. Kodak Tri-X Aerecon Film Type 8403, processed clear.

e. 9-1/2 inch x 1000 ft. Kodak High Definition Aerial Film Type 3404, processed clear.

Items a - e for use in 5.5.1

f. 70mm x 100 ft. Type 3404 processed to 1.0 to 2.0 density.

g. 9-1/2 inch x 100 ft. Type 3404 processed to 1.0 to 2.0 density.

h. 9-1/2 inch x 250 ft. Kodak Fine Grain Aerial Duplicating Film Type 8430, processed to 1.0 to 2.0 density.

Items f - h for use in 5.5.2, 5.5.3 and 5.5.4

i. 9-1/2 inch x 100 ft. Type 3404 processed clear stock.

j. 9-1/2 inch x 100 ft. Kodak Aerographic Duplicating Film Type 2427 or Kodak Fine Grain Aerial Duplicating Film, Type 8430 processed clear stock.

Items i - j for use in 5.5.3

3.2.4 One test loop containing the following:

a. 15 ft. of high density leader with window cut-out and Kodak Photographic Step Tablet No. 1A taped in.

b. Kodak Calibrated Step Tablet No. 1A (0 to 3.0 density) with calibration record. (Tablet installed in a. above)

c. Two resolution tablets, spliced together (100:1 contrast in USAF 1951 format per Dwg. 2-023-C-013).

1. 80-800 l/mm, clear lines on high density background

2. 40-400 l/mm, clear lines on high density background

3.3 Power Requirements

3.3.1	Voltage	208/120 volts ± 10%
3.3.2	Current	20 amps/phase
3.3.3	Frequency	60Hz
3.3.4	No. phases	3 Ph
3.3.5	No. wires	4
3.3.6	Power required	4500 watts

3.4 Easel Exhauster Requirements

3.4.1 Exhauster assembly may sit on the floor and the intake port of the exhauster should be located so that the air tube from the enlarger leads directly to the intake port. Also, the exhaust ports of the exhauster should be at least six inches from any wall.

3.5 Immersion Fluid Vapor Exhaust Requirements

3.5.1 An outdoor exhaust system equipped with an input nipple 4-inch O.D. by 1.5 inches long to receive the end of the flexible tube. In addition, the outdoor system should have an additional blower to prevent reversal of the air flow by back pressure. The system must be adequate to handle at least 300 cfm per Dwg. 1-023-B-513.

4.0 Conditions

4.1 Test Area

4.1.1 The test area shall be a clean photographic darkroom, equipped with safelights and the required power and exhaust systems.

4.2 Test Preparation

4.2.1 Install the unit in the test area.

4.3 Precautions

4.3.1 Test personnel shall be skilled in operating this type of equipment.

4.3.2 Test results shall be judged by qualified personnel only.

4.3.3 Make certain unit is connected to outside vent before running tests.

4.3.4 Before projection lamp is operated ascertain that easel exhauster is operating.

4.4. Environmental Conditions

4.4.1 Tests shall be performed at room temperature and humidity conditions which are considered normal for film handling.

4.5 Documentation

4.5.1 All data, including malfunction reports, repairs, etc., shall be recorded on the Acceptance Test Report 1-023-A-613.

5.0 Test Procedure

The following procedure constitutes an acceptance test for the Briefing Print Enlarger, Part No. 1-023-E-001. The procedure here listed is limited to acceptance test only.

5.1 Initial Documentation

5.1.1 Record the following name plate data where applicable:

a. Prime Contract No.

b. Mfr. Part No.

c. Mfr. Serial No.

d. Date of Mfr.

5.2 Visual and Pre-Operational Inspection

Check general workmanship, appearance and completeness of assembly and accessories. Use Instruction Manual as a guide.

5.2.1 Main control panel

5.2.1.1 Ascertain that the MAIN power switch controls:

a. Primary power to enlarger unit.

b. Primary power to easel exhauster.

c. Easel photometer not affected by MAIN power switch.

5.2.1.2 Ascertain the following with the POWER ON pilot lamp:

a. MAIN power switch on - pilot lamp lights.

b. Turn the cap - pilot lamp dims.

5.2.1.3 Turn VIEWER ON/OFF switch and ascertain:

a. Switch turns viewer on and off.

5.2.1.4 Depress LIQUID PUMPS button and ascertain:

a. Both injection pumps function.

b. Interlocks are set.

c. Interlocks are released at end of drying cycle.

5.2.1.5 Move the VERTICAL MOTION switch to all three positions and ascertain:

a. UP position - transport moves upward.

b. Center position - transport is off.

c. Down position - transport moves downward.

d. Top limit switch - stops unit when bottom edge of film is no more than 1/4 inch below scribed line on viewer.

e. Lower limit switch - stops unit when top edge of film comes within 1/2 inch of gate center.

5.2.1.6 Move the VERTICAL SPEED dial and ascertain:

a. Rotated CW - increases speed of transport unit when moving up or down.

b. Dial does not control speed after the LIQUID PUMPS button has been depressed.

c. Vertical (Y) coordinate counter functions.

5.2.1.7 Set DIRECTION switch in both positions and ascertain:

a. Switch controls direction of film wind on the spindles according to diagram at switch.

5.2.1.8 Set THD/RUN switch in both positions and ascertain:

a. THD position - torque motors off and brakes on at low drag torque.

b. Run position - supply and take-up spindles respond to horizontal drive hand control.

5.2.1.9 Turn metering roll by hand and ascertain that all the numbers show.

5.2.2 Sub-Control panel

5.2.2.1 Move the lens locking lever in the down and up positions and ascertain:

a. Up position - lens is not locked in.

b. Up position - LOCK LENS light comes on.

c. Down position - LOCK LENS light goes off.

d. Down position - lens is locked in.

5.2.2.2 Move the easel locking lever in the down and up positions and ascertain:

a. Down position - easel is not locked.

b. Down position - LOCK EASEL light comes on.

c. Up position - LOCK EASEL light goes off.

d. Up position - easel is locked.

5.2.2.3 Timer Control box

Operating the exposure timer as described in Manual, calibrate timer dials by comparison with calibrated electric timer. The time of exposure shall be within ±5% of the timer setting for settings between 3.0 and 110 seconds. The variation of time - of-exposure for a succession of five exposures shall not exceed

a range of 4% of the mean time of exposure for the set.

a. Center dial

1. 3 sec.

2. 8 sec.

b. Upper dial

1. 30 sec.

2. 80 sec.

5.2.2.4 Place a condenser in lamphouse and check for proper operation of focus condenser indicator lamp on sub-control panel.

a. "A" condenser in lamphouse.

b. "B" condenser in lamphouse.

5.2.2.5 Depress each FILTER WHEEL POSITION push button and ascertain:

a. Red push button - red filter in print position and red attenuator control on photometer is effective.

b. Green push button - green filter in position and green attenuator control on photometer is effective.

c. Blue push button - blue filter in print position and blue attenuator control on photometer is effective.

d. White push button establishes conditions for color exposure cycle as described in the manual.

5.2.2.6 Turn the POWER switch on and ascertain:

a. Power is supplied to timer.

5.2.2.7 Move the TIMING/CONSTANT switch to both positions and ascertain:

a. In CONSTANT - lamp remains on.

b. In TIMING - lamp operates on timer settings.

5.2.2.8 Move the LAMP INTENSITY switch and ascertain:

a. Switch can increase intensity of printing lamp.

b. Switch can decrease intensity of printing lamp.

5.2.2.9 Depress the PHOTOMETER push button and ascertain:

a. If depressed after enlarger lamp is on - probe light turns off and meter light goes on.

b. If enlarger lamp is turned off - photometer returns to standby condition.

5.2.3 Easel drive assembly

5.2.3.1 Turn fine adjustment knob on right side of easel drive assembly and ascertain:

a. Pushed in - engaged in detent.

b. Pulled out - disengages detent.

c. Can fine adjust easel position.

5.2.3.2 Move motor control switch on the top of the easel drive assembly and ascertain:

a. Switch pushed to right - easel moves away from lens.

b. Switch pushed to left - easel moves toward lens.

c. Small window on top of easel drive assembly displays OAC distance.

d. Limit switch stops easel motor at end of travel.

5.2.4 Easel and exhauster unit

5.2.4.1 With MAIN power on at both the main control panel and at the exhauster unit, proceed to check for the following:

a. Ascertain that vacuum easel is operating properly with and without the dark screen.

b. Ascertain proper direction of rotation of exhauster.

c. Check easel for visual damage.

d. Check dark screen for visual damage.

5.2.5 Lamphouse

a. Ascertain that the gate closing functions properly as indicated in manual.

b. Ascertain that both optical and air filters are clean.

c. Check for visual damage to filters.

d. Ascertain that filters can be changed with ease.

e. Ascertain that the vapor exhaust blower functions.

5.2.6 Guide rollers (2)

a. Check for surface defects.

b. Check for freedom of rotation.

c. Check for range of slat motion.

d. Check visually for roundness.

5.3 Safety Inspection

a. Ascertain that the equipment is electrically grounded.

b. Look for areas hazardous to the product.

c. Look for operator hazards.

5.4 Pre-Operational Procedure

Set up enlarger as per instructions in manual.

5.5 Operational Tests

CAUTION: Ascertain that the easel exhauster is running before turning lamphouse on for all tests.

The operation of the Briefing Print Enlarger, Part No. 1-023-E-001, can be considered acceptable when all switches, controls, charts, visual and mechanical inspections and photographic tests have been completed. There shall be no damage to material tested.

5.5.1 Tracking tests are to be run in both directions using the following materials: (250 ft. rolls consitute both scratch and tracking test - 1000 ft. rolls may be used repeatedly for tracking for several enlargers - not to be considered for scratch check criteria.)

a. 70mm x 250', clear processed, Type 8403.

b. 70mm x 1000', clear processed, Type 3404.

c. 5" x 250', clear processed, Type 3404.

d. 9-1/2" x 250', clear processed, Type 8403.

e. 9-1/2" x 1000', clear processed, Type 3404.

5.5.1.1 Check tracking in both directions using above materials. There shall be no tendency to rub or climb spool flanges.

5.5.1.2 Examine material (250 ft. rolls) for machine damage and enter all data on the Acceptance Test Report form, Dwg. 1-023-A-613.

5.5.1.3 Check FILM TENSION switch by holding edge of film material while changing switch position. Ascertain that the switch does change tension. Ascertain that a normal setting on the FILM TENSION switch is adequate.

5.5.1.4 Move HORIZONTAL control handle from left to right and ascertain the following while trigger switch is depressed:

a. CW direction - film moves from left to right.

b. Intermediate position - film stops.

c. CCW direction - film moves from right to left.

d. Horizontal (X) coordinate counter functions.

5.5.2 Gate impression tests.

Using a 9-1/2 inch x 3 ft. section of Type 8403 film exposed and processed to 1.00 to 2.00 density submit film sample to multiple closing of the negative gate with immersion fluid (at least six times). Easel exhauster must be operating.

a. Ascertain that there is no damage to the material tested.

5.5.3 Drying tests

5.5.3.1 Using a strip of 9-1/2 inch cleared Type 3404 film in the negative gate, operate the fluid injection system and ascertain:

a. The fluid delivery is adequate to permit proper operation of the negative gate.

b. The drying cycle is adequate.

5.5.3.2 Repeat 5.5.3.1 using 9-1/2" Type 2427 or 8430 film.

5.5.4 Lamphouse temperature tests with F lens and condenser assembly.

5.5.4.1 Using a 9-1/2" x 3' (exposed and processed to a uniform density of 1.0 to 2.0) sample of Type 3404, insert in the gate with the immersion fluid. Operate the enlarger for twenty minutes continuously with the lamp at maximum intensity and no filter in the wheel assembly.

a. Ascertain that there is no evidence of heat damage to test sample.

5.5.5 Uniformity tests

Note: Perform this test for each lens set (A to F) using the easel photometer as a measuring tool.

5.5.5.1 With no negative or optical filter in the enlarger, relative measurements should be made on the axis and at four points around the axis, 90° apart at .8 of the specified field radius for the particular magnification setting.

a. Lens "A" set measure at 60" and 70" OAC.

b. Lens "B" set measure at 55" and 70" OAC.

c. Lens "C" set measure at 62" OAC.

d. Lens "D" set measure at 62" OAC.

e. Lens "E" set measure at 62" OAC.

f. Lens "F" set measure at 62" OAC.

5.5.6 Resolution tests

Note: Perform this test for each lens set (A-F).

5.5.6.1 Place the appropriate resolution target in the enlarger gate without immersion fluid. Using a W98 blue filter in the lamphouse, expose the test target on Fine Grain Positive film.

a. Using the "A" lens set expose the axial test target at 57", 60", 65", 70" and 80" OAC. Expose the 70% of full field radius targets at 65" OAC.

b. Using, in turn the B, C, D, E and F lens sets, expose the axial test target at 50", 55", 62", 70" and 80" OAC. Expose the 70% of full field radius targets at 62" OAC.

Process the Fine Grain Positive film as recommended by the manufacturer.

5.5.6.2 The arithmetic average of radial and tangential resolving power for four targets in the field of view separated by 90° at a radial distance of 70% of the specified full field radius shall be no less than 70% of the resolution measured on axis.

5.5.7 Photographic test

5.5.7.1 Place the "C" condenser and lens set on the enlarger. Set the OAC at 80 inches.

5.5.7.2 Position the Kodak Photographic Step Tablet No. 1A with that area having a density closest to 2.0 in the gate, without immersion fluid. Set the timer for sixty seconds. Have the blue filter wheel in print position and the lamp intensity at maximum.

5.5.7.3 Expose fresh Kodabromide F-2 paper and process as recommended by manufacturer. Read and plot densities of the 2.0 density and density patches on each side as exposed on the Kodabromide paper. By interpolation of the above plot, the print density achieved through a 2.0 density shall be 0.1 or more above base plus fog density.